CLAIMS

I claim:

1. An apparatus comprising:

a regulator including a charge-transfer part that is operable to supply a charging signal to a battery;

a feedback module that is operable to provide to the regulator feedback for regulating the charging signal, wherein the feedback corresponds to a charging-signal effect on a charged stored in the battery;

a controller for interrupting the feedback module so as to cause the regulator to suspend supplying the charging signal to allow the charge-transfer part to discharge for a predetermined period of time; and

a detector module for detecting whether during the predetermined period a charge stored on the charge-transfer part satisfies a predetermined threshold, wherein when the charge stored on the charge transfer part satisfies the predetermined threshold, the detector module detects at least one condition that indicates that the battery cannot be charged.

2. The apparatus of claim 1, further comprising a load coupled to the regulator.

3. The apparatus of claim 1, wherein the charge-transfer part is operable to supply the charging signal in excess of a charge stored in the battery.

4. The apparatus of claim 1, wherein the predetermined threshold is set at a value below a pre-selected minimum charging level of the battery.

5. The apparatus of claim 4, wherein when the charge stored on the charge transfer part falls below the predetermined threshold, the detector module detects at least one condition that indicates that the battery cannot be charged.

6. The apparatus of claim 1, wherein the predetermined threshold is set at a value approximately equal to a minimum charging level of a reference battery.

7. The apparatus of claim 6, wherein when the charge stored on the charge transfer part falls below the predetermined threshold, the detector module detects at least one condition that indicates that the battery cannot be charged.

8. The apparatus of claim 1, wherein the predetermined threshold is set at a value equal to a minimum charging level of a reference battery.

9. The apparatus of claim 8, wherein when the charge stored on the charge transfer part falls below the predetermined threshold, the detector module detects at least one condition that indicates that the battery cannot be charged.

10. The apparatus of claim 1, further comprising an indicator module for indicating when the charge stored on the charge-transfer part satisfies the predetermined threshold.

11. The apparatus of claim 10, wherein the indicator module comprises an illuminating indicator, wherein when the charge stored on the charge-transfer part satisfies the predetermined threshold, the illuminating indicator illuminates.

12. The apparatus of claim 10, wherein the indicator module comprises an illuminating indicator, wherein when the charge stored on the charge-transfer part

does not satisfy the predetermined threshold, the illuminating indicator illuminates.

13. The apparatus of claim 10, wherein the indicator module comprises an illuminating indicator, wherein when the charge stored on the charge-transfer part does not satisfy the predetermined threshold, the illuminating indicator illuminates.

14. The apparatus of claim 1, wherein the condition that indicates that the battery cannot be charged comprises a condition indicating that the battery is absent.

15. The apparatus of claim 1, wherein the condition that indicates that the battery cannot be charged comprises a condition indicating that the battery is defective.

16. The apparatus of claim 1, wherein the regulator comprises any of a DC-DC converter, a transformer and rectifier bridge combination, a switching power supply, a voltage rectification and regulation component, a microprocessor, and analog or digital sources capable of supplying the charging signal.

17. The apparatus of the claim 1, wherein the feedback module comprises any of a pulse-width-modulation signal generator, pulse-frequency-modulation signal generator, feedback-controlled generator, hysteretic signal generator, and microprocessor timing controller.

18. The apparatus of claim 1, wherein the detector module and controller are combined so as to form a detection-and-control module.

19. The apparatus of claim 18, wherein the detection-and-control module comprises:

a comparator for detecting when the charging signal satisfies the predetermined threshold and for responsively providing a threshold-detection signal; and

a detection controller having an interval sequencer for interrupting the feedback module and a timer/driver for providing a detection-driver signal indicating that the battery cannot be charged, wherein the interval sequencer continuously interrupts the feedback module in response to the threshold-detection signal, and wherein the timer/driver provides the detection-driver signal after the charging signal satisfies the predetermined threshold for a given period of time.

20. The apparatus of claim 19, wherein the comparator comprises an analog or digital comparator.

21. The apparatus of claim 19, wherein the interval sequencer comprises a signal generator.

22. The apparatus of claim 21, wherein the signal generator produces an interruptible period-pulse-type signal.

23. The apparatus of claim 19, wherein the timer/driver comprises:

a timer module that counts to a pre-selected value in response to the threshold-detection signal; and

a driver module for providing the detection-driver signal after the charging signal satisfies the predetermined threshold for a given period of time.

24. The apparatus of claim 19, wherein the given period of time is instantaneous.

25. The apparatus of claim 19, further including a signal inverter for inverting the threshold-detection signal to prevent false detection the at least one condition that indicates that the battery cannot be charged.

26. The apparatus of claim 2, wherein the apparatus is deployed in a battery charging device.

27. The apparatus of claim 2, wherein the apparatus is deployed in a battery testing device.

28. In a device for charging a battery, a method for detecting a condition that indicates that a battery cannot be charged comprising:

performing charging-signal regulation to supply a charging signal to charge the battery;

interrupting the charging-signal regulation to allow discharge of the charging signal; and

responsive to the charging signal, detecting at least one battery condition that indicates that the battery cannot be charged.

29. The method of claim 28, wherein the step of performing charging-signal regulation comprises supplying an interruptible charging signal to the battery, wherein when interrupted, the charging signal is operable to discharge.

30. The method of claim 30, wherein the step of performing charging-signal regulation comprises using feedback that corresponds to a charging-signal effect on a charge stored in the battery.

31. The method of claim 28, wherein the step of performing charging-signal regulation comprises using feedback that corresponds to a charging-signal effect on a charge stored in the battery.

32. The method of claim 32, wherein the step of interrupting the charging-signal regulation to allow discharge of the charging signal comprises interrupting the feedback so as to cause the charging signal to discharge.

33. The method of claim 28, wherein the step of detecting at least one battery condition that indicates that the battery cannot be charged comprises detecting whether the charging signal satisfies a predetermined threshold.

34. The method of claim 34, wherein the step of detecting whether the charging signal satisfies a predetermined threshold occurs after the charging signal has discharged for a predetermined period.

35. The method of claim 34, wherein the predetermined threshold is set at a value below a pre-selected minimum charging level of the battery.

36. The method of claim 34, wherein the predetermined threshold is set at a value approximately equal to a minimum charging level of a reference battery.

37. The method of claim 34, wherein the predetermined threshold is set at a value equal to a minimum charging level of a reference battery.

38. The method of claim 28, wherein the charging signal is supplied in excess of a charge stored in the battery.

39. The method of claim 28, further comprising indicating that the battery cannot be charged.

40. The method of claim 39, wherein the step of indicating that the battery cannot be charged comprises illuminating an illuminating indicator.

41. The method of claim 39, wherein the step of indicating that the battery cannot be charged comprises providing an audio alert.

42. The method of claim 28, wherein the condition that indicates that the battery cannot be charged comprises a condition indicating that the battery is absent.

43. The method of claim 28, wherein the condition that indicates that the battery cannot be charged comprises a condition indicating that the battery is defective.